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The Effect of Induced Anxiety on Flexibility of Intellectual Functioning

By
Ernst Gunter Beier

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The Effect of Induced Anxiety on Flexibility of Intellectual Functioning

By

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ERNST GUNTER BEIER

Chapter I

INTRODUCTION

All sources of our information on human behavior agree that people act differently under stress from the way they would otherwise behave. The research worker in psychology cannot, however, be content with the description "differently." His task is to determine what the word "differently" means in the context of human behavior, what effect stress has on the individuals concerned, and in what way these two—the stress situation and the different behavior patterns affected by stress—are related.

Such an investigation faces certain difficulties. Only a *specific* stress and *specific* behavior pattern can be subjected to investigation, as well as specific relationships of the two; this is with the hope that although specificity is paramount, certain *generalizations* drawn from these instances would be valid. The first step is to limit the problem to an area sufficiently specific to be adequately investigated.

Many workers in the field have been concerned with the question as to whether people under stress exhibit an alteration of their "perceptual field," whether they become more rigid and narrowed in their behavior, whether one can speak of resulting disorganization of behavior and, if so, in what way this disorganization takes place. The present study falls within the area of these problems but concerns itself with the question as to whether or not a *loss* of abstract ability, i.e., the ability to generalize or shift from one concept to another or the ability to grasp the essence of a situation, is a common phenomenon which occurs in nonclinical subjects when under stress. Do individuals who have proved a capacity to attack a task in various ways lose what may be called their "quality of variability" when under stress? Goldstein (5), for example, asserts that the "preferred behavior" of an individual (his possible choices) is "narrowed" in such a situation, that his perceptual field decreases, that "his behavior becomes compulsive and stereotyped," and that he experiences "difficulties in voluntary shifting" and a "lack of freedom of action." In brief, *this study is concerned with the relationship between perceived threat and various intellectual functions which may reflect rigidity.*

A few words about stress are advisable. It is recognized that the term "stress" is a collective name for many factors: anxiety, fear, frustration, etc. Unfortunately, at the present time none of these factors can be fully isolated, either by definition or by procedure. For the purpose of this study, "stress" will be defined as the *perception of threat, with resulting anxiety.* In the present study the condition of anxiety was produced by an interpretation of a "personality record" derived from a projective test, the Rorschach Psychodiagnostics. Such an interpretation may present a threat to the individual as his emotional involvements and defense mechanisms are revealed to him. It is thought that it may arouse anxiety in him to find that intimate thoughts and behavior patterns are disclosed in the experimental situation, or to think that he "gives himself away" easily. It is thought that such an interpretation may threaten his "self-concept." The present study, however, has its

orientation principally in the *effect* of stress on certain *capabilities.*

It may be worth while to discuss some implications of such a study. One could, for instance, consider its meaning to personality theory. Goldstein (5) asserts that in the brain-damaged individual a loss of abstract ability occurs which diminishes the individual's ability to cope with his environment. For Goldstein the loss of abstract behavior is the eventual *cause* of anxiety. This study attempts to establish to what extent the loss of abstract behavior is also the *consequence* of anxiety. If loss in abstract functioning can be established as interrelated cause *and* consequence of anxiety, one could obtain an experimental proof of the self-perpetuating quality which occurs in maladjusted behavior.

There are also implications of this study for psychotherapy. Several schools of psychotherapy believe that the therapist should induce anxiety in the patient by attacking the patient's defenses in order to help him reorganize certain aspects of his personality structure. It is the awareness of this disorganization which has to be brought about before the patient can grow to maturity and self-organization. The nondirective approach to psychotherapy, on the other hand, holds that the threat to the patient in the therapeutic situation should be held to a minimum. Rogers states that "in therapy of client-centered form the relationship and the handling of it by the counselor gradually assures the client that he is accepted as he is, and that each new facet of himself which is revealed is also accepted. It is then that experiences which have been denied can be symbolized, often very gradually, and hence brought into conscious form. Once they are conscious, the concept of self is expanded so that they may be included as a part of a consistent total" (14, p. 35). The acceptance of perceptions which have been hitherto hidden and their symbolization into conscious form are the essence of the therapeutic process and can occur only during freedom from threat. The results of this study may prove to be of direct bearing on the evaluation of the use of "anxiety" in therapy.

In summary it can be said that this study concerns itself with an investigation of the effects of stress, i.e., threat and anxiety, on the organization of intellectual behavior.

Chapter II

ORIENTATION

Goldstein (6) believes he has found what Freeman (2) calls the Plimsoll mark in the abstract ability of an individual. The presence of this capacity permits the individual to deal adequately with a large number of life situations. It can be said to give the individual high "frustration tolerance." Deterioration and loss of this ability, to repeat some of his definitions, results in "an inability to discover the essence of a situation"; characteristic changes in memory and attention take place which interfere with voluntary assumptions of mental sets, the ability to shift from one aspect of a situation to another, the holding in mind of various aspects of a situation simultaneously, the formation of hierarchic concepts, the capacity for planning ahead ideationally or the ability to think and perform symbolically (6, p. 4). Loss of such factors disables the organism in such a way that it can no longer deal with even minor threats. "Abstract ability" is very closely related to "flexibility of intellectual functioning" as defined in this study (6).

Facing threats that the organism cannot deal with provokes an onset of "catastrophic reactions" which are disordered, inconstant, and inconsistent: under such circumstances an individual acts with a "rigid point of view . . . he becomes more or less unresponsive and fails even in those tasks which he could easily have met under other circumstances"; ". . . catastrophic shocks . . . represent a disequilibrium which must be overcome if the organism is not to lose its existence (5, p. 512).

In Goldstein's terms, then, the loss of "abstract ability" as found in persons with mental disorders does not permit the individual to deal adequately with the environment and causes a frequent onset of "catastrophic reactions."

It should be emphasized again that Goldstein's question is concerned with the *effects* of the loss of "abstract ability" whereas the present study is concerned with the question of *whether or not experimentally induced anxiety causes loss of this ability.*

Rogers states that "when perceptions are contradictory to the self-concept, it tends to organize itself more rigidly in defense" (14, p. 34). This proposition has direct bearing on the questions dealt with in the present study in which threat can be considered as a concord of perceptions that the individual cannot integrate into his self-concept. He hears an interpretation which deals either with a part of his personality as yet unknown to him or with aspects he had thought secret. Rogers' proposition, which he considers a key to nondirective psychotherapy, is that the resulting anxiety serves either to "defeat, expel or neutralize the threat" by decreasing perceptibility and by inducing greater rigidity in the organization of the responses. This theory of constriction has yet to be verified experimentally, and the present study can be considered an attempt in this direction.

Freud (3), Fromm-Reichmann (4), Mowrer (12), and others seem to agree fundamentally with Rogers. Freud states that "external danger must have undergone internalization if it is to become significant to the ego" (3, p. 116), and again that "anxiety is the original reaction to helplessness in the traumatic situation" (3, p. 114).

Anxiety re-occurs when hitherto successfully repressed material, under new stimuli is threatening to force ideational representation. This line of thought is related to Rogers' proposition that anxiety occurs because of the forceful and sudden awareness of perceptions not hitherto integrated into the self-concept. But how, specifically, does an individual perceive threat?

The particular way in which an individual *perceives* a stimulus is determined by the individual's *needs*. The same stimulus may be perceived by the same individual in many different ways. For example, in the presence of the hunger drive, Charlie Chaplin in *The Gold Rush* perceives his friend as a chicken, a perception that hardly would have taken place in the absence of intense hunger.

In maladjustment and disorder, where conflicting needs and drives operate within the individual, perceptions which are determined by these conflicting needs will be confused.

The individual who thinks of himself as a Puritan and at the same time is driven by strong sexual needs, may perceive a female figure simultaneously as "sacred" and "profane." His own perception is so confusing to him that he does not seem able to "make up his mind," and as "sacred" perception and "profane" perception have antagonistic response actions, he will also be unable to act, i.e., to release tension.

This confusion in perception is evident in the "inability of attention," the "distractibility" which has been observed by so many workers. The disordered individual seems to be unable to participate in a social situation, as Hunt (8) suggests; he is withdrawn because he perceives his environment in conflicting ways. Here, one can call to mind the indecisiveness of the neurotic, the bizarre responses of the schizophrenic.

It is in the lack of the adequate response action that both the "loss of abstract ability" and the "disorientation of the perceptual field" fuse. The ability to judge, to see essential relationships, to shift adequately—all these abilities are disturbed because the individual projects his own need-confusion upon the stimulus, i.e., perceives the stimulus in terms of such conflicting needs that he cannot respond adequately.

It is within this framework that the present study is attempting to establish its place. According to the hypothesis of this study, the individual in a state of anxiety is experiencing that type of disturbance that is characterized by deterioration in abstract thinking and by disorientation of behavior.

In frustration experiments, which are built around a specific and known threat to the individual (11), such deterioration and disorganization has been recognized as a possibility. In an experiment with generalized threat, that is, anxiety, these factors (if the underlying assumptions are true) can be expected to show up more clearly.

Chapter III

PROCEDURE

A. Population

The purpose of the investigation was to measure the effect of "threat" on certain performances. "Stress" has been defined for this study as the perception of threat with resulting anxiety, a condition that was to be produced by a Rorschach interpretation. Performance was to be measured in terms of data received from tests which were selected to measure an individual's ability to sustain several tasks simultaneously and to synthesize them into a single complex operation, his ability to shift from one concept to another, and the degree of his efficiency in a task calling for the reversal of an established visual-motor habit.

In order to attack this problem, it was necessary to secure subjects for the experiment, to devise a standardized method to produce threat, and to select tests applying to the hypothesis. The experimental design had to be devised in such a way as to give some information concerning the capability of the subject to perform in the area of abstract behavior. This sample, then, had to be divided into experimental and control groups and to be retested with tests designed to measure that same ability. Finally, the experimental variable had to be introduced into the experimental group, so that the effect of the variable could be seen in the outcome of the second test performance of the group.

Sixty-two female students at Teachers College, Columbia University, were chosen for the study. The request for volunteers (Appendix A) contained the statement that a *personality interpretation* would be given; and it is quite possible that students assisted because they wished to understand certain emotional disturbances they experienced. No implications made in this study, however, are considered as based on a "normal" population. It was considered helpful to obtain a sample which might possibly show a large variability in the Rorschach adjustment rating.

In order to effect the division into control and experimental groups with greater ease, some factors were controlled from the start. The subjects were all female graduate students ranging in age from 20 to 30 years.

These subjects were invited to take a number of tests which had been selected for their pertinence to the study. In addition, the students' "intelligence level" was measured with a short, steeply-graded vocabulary test (9). An adjustment rating was derived from the projective test (15).

All the information obtained was utilized to separate this sample of 62 individuals into two equated groups. It was to be expected that the equating of this sample into two groups by means of the scores of all three tests would present difficulties. It was decided, therefore, to start the equating process with the test which measured the ability to think with abstract symbols, since this ability was considered central to the experiment and its loss or gain the problem of the investigation.

The subjects were divided into experimental (E) and control (C) groups in a way that these two groups could be considered equated according to certain criteria. The mean score and the stand-

ard deviation on the Abstract Reasoning test of the E group, $\overline{X} = 36.06$ and $SD = 7.83$, compared with the following values of the C group: $\overline{X} = 35.87$ and $SD = 8.21$. On the Vocabulary test, the E group had a mean of 14.55 with a standard deviation of 2.95 while the C group had a mean of 13.61 with a SD of 3.09. The differences between the two groups are not statistically significant. Neither are the differences between the correlation coefficients of the two tests for either group statistically significant: E:$r_{23} = .35$; C:$r_{23} = .39$. According to ratings on the Rorschach, the E group had 10 adjusted, 10 questionably adjusted, and 11 maladjusted members, while the C group had 10 adjusted, 11 questionably adjusted, and 10 maladjusted members.

B. Rationale for Choosing Tests and Their Description and Use

1. *The Rorschach Test, Group Administration*

Description. The Rorschach test was selected for two purposes. First, a measure had to be found which would yield an adjustment rating in such a way that subjects who came to the testing situation with "anxieties" could be compared separately. Secondly, this test could be used as a threat-inducing instrument.

Administration. The ten plates of the Rorschach Psychodiagnostics (15) were used in a group administration according to the procedure outlined by Munroe (13). The blots were projected onto a screen measuring three feet by five feet.

Adjustment Rating. The experimenter rejected the adjustment score recommended by Munroe (13) in favor of a rating by judges. This adjustment rating was utilized in the division of the total group into experimental and control groups. For this purpose the records were first scored according to the instructions given by Krugman (10); then their deviations from the normal record, also according to Krugman, were marked, and the records were given one of three possible ratings by three judges trained in the Rorschach method. The three ratings were: (*a*) adjusted; (*b*) questionably adjusted; (*c*) maladjusted. In Appendix B a key for the deviations from the normal record can be found.

Threat. The Rorschach test was selected because it constituted a suitable device for offering a temporary "threat" to the subjects in question. Many Rorschach investigators such as Krugman, Vorhaus, and Klopfer assume that the presentation of a Rorschach interpretation to the subject is likely to arouse anxiety. Among students not particularly trained in this test, the Rorschach seems to have a mysterious and exciting aura. Indeed, it was not infrequently observed that mere mention of this test provoked emotional responses which, considering the stimuli, seemed greatly exaggerated. The threat introduced by the Rorschach interpretation would be "ego-involving"; that is, it was thought to arouse anxiety, as differentiated from frustration, punishment, or interference.

The interpretation given to the subjects was standardized only as to the areas which were discussed, and within these areas the interpretation was in accordance with the findings of the individual's record. *This fact means that each interpretation was somewhat different from any other interpretation.* The question arose as to whether the better-adjusted subjects received a less "threatening" interpretation than the poorly adjusted subjects. It should be noted that this eventuality was controlled, insofar as possible, in the matched group design of the experiment, where the adjustment ratings were also considered in the equating of the two groups.

In order to evoke threat, several areas of possible involvement had to be touched. The following areas were selected: (*a*) intelligence level and functioning, with the five usual factors of intelligence considered (10) and compared to productivity and the quality of the product; (*b*) adjustment to others—here the $H : (H)$ responses being considered, as well as the M responses and their quality, and the $M : C$ balance and the anxiety indicators (10) were utilized; (*c*) adjustment to self, utilizing $M : C$ balance, the ΣC, the $CF : FC$ ratio, and the anxiety indicators; and (*d*) mechanisms, here using significant deviations from the normal record.

Although many workers in the field agree that a Rorschach interpretation would present a threat to the subject, the experimenter did not rely on such an interpretation alone. Accordingly, the wording to the introduction to the interpretation was carefully planned and contained phrases such as, "I expect you want me to be frank with you," and gestures such as the offering of a cigarette at a critical time. The subject during the interpretation was carefully observed for manifestations of experience of threat.

2. *The Abstract Reasoning Test*

Description. Of the many tests of abstract reasoning available—tests in which the ability

to think with abstract symbols could be measured objectively. The Abstract Reasoning test, a subtest of the Differential Aptitude Tests (1), was selected because of the complexity of the "operating principle" which had to be discovered in every item and because the test is available in two forms.

Each of the two forms, A and B, contains 50 items. The item is presented as a series of symbols and changing diagrams, and the subject is required to perceive the operating principle accounting for the change. In each instance after discovering the principles governing the change of the figures, the subject must give evidence of his understanding by marking the diagram which should logically follow. The task in each case is the generalization of the changes into the operating principle. The increasing conceptual difficulty makes for the increased complexity of the principle involved. To solve each problem, the individual has to sustain a number of tasks simultaneously and synthesize them into a single complex operation.

Administration. Form A of the Abstract Reasoning test was administered as a group test. Form B was given as an individual test in the second session. Both tests were administered and scored according to the manual (1).

Use of Test. Form A was used to equate the two groups on their ability to work with abstract symbols. Both forms were used to measure the change in performance after the introduction of threat (E group).

3. *The Vocabulary Test*

Description. A short vocabulary test was introduced to obtain a measure of verbal intelligence. The vocabulary test is the short form of Lorge's Adult Reading Test of the Institute of Educational Research, Teachers College, Columbia University (9). This is a steeply-graded vocabulary test consisting of only 20 words.

Administration. The vocabulary test was administered in the group session to all the subjects according to the directions given by the Institute of Educational Research.

Use of Test. This test was used to help in equating the two groups and to help in controlling the factor of intelligence.

4. *The Mirror Tracing Test*

Description. The Mirror Tracing test with error attachment was extensively used for experiments in trial-and-error learning by Snoddy (16). The test used here is the metal star type which has to be traced with a stylus. The error attachment records automatically the number of times the stylus touches the sides of the grooves of the star.

Snoddy believes that the Mirror Tracing test presents the adult subject with a problem requiring him to go back to "genetically early learning" which in the main he has not expressed or demonstrated since childhood. The experimenter does not agree with Snoddy but believes that, as Wechsler suggested, the Mirror Tracing test presents the subject with a nonhabitual or surprise situation which gives a measure of his integrative behavior and state of orientation. The subject has (*a*) to make several different hypotheses and to apply his judgment as to the value of them, (*b*) to discover the general principles, by concentrating on the right cues, and (*c*) to translate these "insights" into a mode of performance. As outlined above, some experimenters (18) have claimed that this instrument is valuable in differentiating neurotic from normal subjects, by giving a measure of the degree of disturbance and orientation of the subject. The evidence accumulated by Wechsler was impressive, and this instrument was included in the present battery of tests principally because the assumption that this test was a measure of disorientation, and particularly disorientation of the perceptual field, was accepted.

Administration. The test was administered with the following instructions: "This is a test in which you are supposed to trace a star with a stylus. Go as fast as you can; but at the same time try to stay in the center of the groove; and don't touch the sides. I shall time you and count the times you touch the sides. Go ahead now."

Use of Test. The results obtained on this test were to be used in the testing of that part of the hypothesis concerned with a measure of motor-visual disorientation.

5. *The Holsopple Test*

Description. Several tests had to be chosen which would give a measure of an individual's ability to "vary his approach." Goldstein (6), Vigotsky (17), Weigl (19), and others have recommended the sorting test as a measure of "abstract ability" and of "concept formation." Rigidity and flexibility were considered phenomena which were closely related to gain and loss of "abstract ability." Unfortunately, the sorting tests of the authors mentioned earlier were not useful with subjects of superior intelligence, nor would it have been possible to utilize them as standardized tools, for they were devised for clinical purposes. Primarily because of its increased complexity, the sorting test devised by Holsopple (7) seemed more adequate to serve the desired function. Preliminary experimentation showed that the administration could be revised so as to yield a quantifiable score.

The Holsopple Sorting Test consists of 28 blocks of varying shape, color, and size. In addition, these blocks have symbols of varying shape, color, and size mounted in the center. There are eight basic categories of generalization:

a) Color of the blocks (red, blue)
b) Shape of the blocks (square, octagon)
c) Size of the blocks (large, small)
d) Thickness of the blocks (thick, thin)
e) Shade of the blocks (pink, light blue)
f) Color of the symbol (white, orange)
g) Shape of the symbol (triangle, circle)
h) Size of the symbol (large, small)

It is the object of this test to measure the subject's ability to "group" or categorize on one or several of the above principles. For instance, the subject is asked to group the principle of "triangularity" from four symbols which represent one large white triangle, one large orange triangle, one small white triangle, and one small orange triangle. Ability to shift from one group of concepts to another is also measured with this test.

Administration. The revised administration of the Holsopple test is more highly structured than the administration recommended by the author. This revision made it possible to devise quantifiable scores and to save considerable time.

The 28 blocks are spread before the subject and the experimenter says: "You see here a number of blocks, each of which is different from another. *All* these blocks are alike in that they are geometric figures, that they are made of plaster, that they have geometric designs in the center, and that they are flattened out. Now, I shall take four blocks and I want you to tell me in which way these *four* blocks are *alike*. Be sure to mention only likenesses which are specific to these four blocks and not to forget about the general likenesses I mentioned."

The test is then administered in six series of four blocks each. The time limit for the presentation of a single series is one minute. Questions as to procedure are answered only during the first series.

Scoring of the Holsopple test proceeded in the following way. The experimenter scored on a recording blank (see Appendix D) the concepts which the subject discovered. Three different scores were derived from the data:

a) Frequency score, which is represented by adding all the concepts discovered, 24 being maximum.

b) Category score, which represents the number of the categories utilized by the subject, a maximum of eight.

c) Capacity score, which represents the percentage of the concepts utilized after they had been discovered. That is, the subject may discover the block-size category in the first series. During the test, he has two more chances to make use of this same category. If he fails to make use of the category again, one can reason that, since he fails to make use of what he already knows, he fails to live up to his *capacity* in this test. The capacity score represents the percentage of utilized concepts.

Use of Test. The results obtained from this test were used to test that part of the hypothesis which is concerned with the ability to shift and to group.

C. Experimental Design

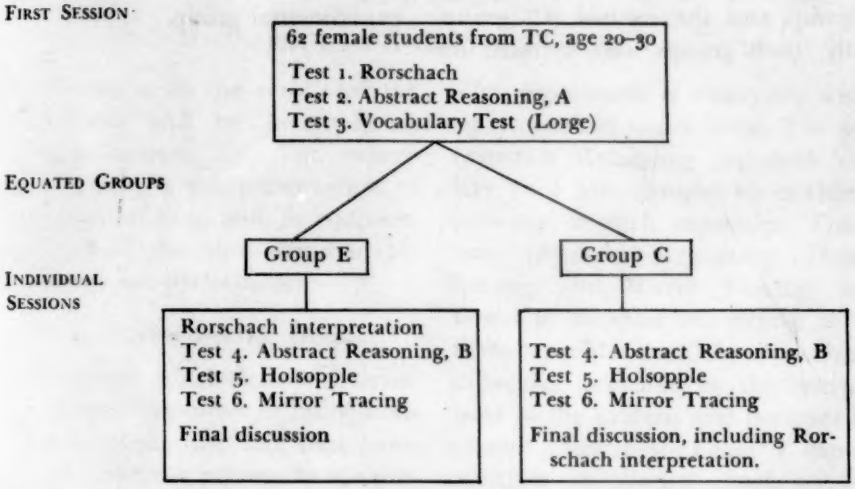
As can be seen in the schema following, there were two groups of individuals, equated as to their sex, age, educational background, scores on a test which measured ability to think in abstract symbols, scores on a vocabulary test, and adjustment ratings on a projective test. These equated groups are referred to as E and C.

Each subject of Groups E and C was invited to an additional individual session with the experimenter in which a series of tests was given to remeasure the abilities measured in the first series of tests.

The experimental variable was now introduced by giving the individuals of Group E, *before* they were retested, an interpretation of their personality records as derived from the Rorschach test. For an example of such an interpretation, see Appendix C. In this experiment the interpretation is thought to constitute a generalized threat, a threat that causes anxiety. The 31 individuals of Group E then are referred to as the subjects who were "threatened," the individuals of Group C as "not threatened." Whereas the individuals of Group E were given the "threatening" interpretation *before* they were retested, the individuals of Group C were given this interpretation only *after* they had been retested.

In addition, subjects in both groups

SCHEMA



were given ten minutes toward the end of the second session in which they were encouraged to discuss the test results. It was thought that this period might serve a therapeutic function. Placing people, experimentally, under stress is rightly considered with apprehension. One cannot predict the limits beyond which such a stress ceases to be harmless and transient to the individuals concerned. It goes without saying that such a procedure demands great caution. This caution was exercised in the selection of volunteers. In addition, the experimenter familiarized himself with the facilities which could offer therapy in the event that students requested such information. Fortunately, at the time of this research, a number of group therapy sessions were started under the supervision of the Department of Psychological Services, Teachers College, Columbia University, to which students participating in this research were invited.

D. Summary

The design of this experiment derives from the question of whether or not an individual under experimentally induced stress would show a loss of abstract ability and a change in the flexibility of his intellectual functioning. Stress in this study has been defined as a "generalized threat," an outcome of the interpretation of a personality record. Abstract ability has been defined as a measure of the ability to sustain several tasks simultaneously and to synthesize them into a single action, the ability to group, and the ability to shift from one concept to another.

Measurements for this study were obtained from: (1) two forms of the Differential Aptitude Abstract Reasoning test (2) the Vocabulary test of the Lorge Adult Reading Test (3) the modified Holsopple Sorting Test, and (4) the Mirror Tracing test. To produce threat, the Rorschach test was selected for reasons outlined in the text.

The design of this experiment was such that a measure of the individual's capacity to perform in the area of abstract behavior could be obtained. This measure, together with such factors as sex, age, training, and adjustment rat-

ings, was used to divide the subjects into two equated groups, the experimental (E) group and the control (C) group. Finally, both groups were retested for this capacity with the experimental variable, "threat," introduced only in the experimental group.

Chapter IV

RESULTS AND DISCUSSION

The discussion of the results of the experiment will be presented in three major sections: (*A*) The experimental design, (*B*) the presentation of the experimental data, and, in addition, (*C*) a record of the observation of behavior during test performance.

A. The Experimental Design

An experiment which deals with deterioration of certain powers in individuals must first establish the fact that these powers were initially present in the subjects. In the present study, in which the onset of deterioration was experimentally introduced, a measure could be obtained by testing the individuals for such capacities *before* the experimentally induced condition. It has to be shown that these *initial* measurements and the measurements taken *after* the onset of the condition are concerned with similar capacities. This necessitates a comparison of these two groups of measurements in the control group. Hereafter, the two sets of measurements will be distinguished in the following way: Tests 2 and 3, the Abstract Reasoning test and the Vocabulary test, which served to establish a measure of the individual's capacities in question, will be called *pretests*. Tests 4, 5a, 5b, 5c, 6a, and 6b (Abstract Reasoning, Form B, Holsopple Sorting, Mirror Tracing) used for posttesting, will be called *posttests*. The question whether or not the capacities measured with the pretests (Abstract Reasoning, Vocabulary) are related to the capacities which were to be measured in the posttests (Abstract Reasoning, Holsopple Sorting, and Mirror Tracing) will be answered here. This experiment is concerned with specific capacities under stress. The pretests (Abstract Reasoning [x_2] and Vocabulary [x_3]) are thought to establish the presence of such capacities. The posttests (Abstract Reasoning, Holsopple Sorting, and Mirror Tracing) are believed to measure the degree to which these capacities have been lost. Were the capacities measured by the instruments used in the pretests and posttests highly related capacities? Table 1 shows the multiple correlation coefficient which serves to evaluate the prediction of each posttest (4, 5a, 5b, 5c, 6a, and 6b) from the pretests, in the control group.

Table 1 reveals that the posttest form of the Abstract Reasoning test ($R_{B4\cdot 23} = .80$) and the Mirror Tracing test, Error Score ($R_{B6b\cdot 23} = .77$) shows the highest multiple correlation coefficients, which gives some information about the reliability with which each posttest can be predicted from the pretests. The multiple correlation coefficients as revealed in Table 1 permit acceptance of the conclusion that the pretest results by and large are highly related with posttest results. However, two exceptions can be found here in the coefficients relating to tests 5b and 6a. Although these tests still relate positively with the pretests, the relationships are rather low and should be interpreted with caution.

B. A Comparison of Test Scores of Experimental and Control Groups After the Experimental Variable Has Been Introduced

If one accepts the results outlined in the first part of this chapter, one can now

TABLE 1

RELATIONSHIP BETWEEN PRETESTS AND POSTTESTS: MULTIPLE CORRELATION COEFFICIENTS AND RELATED DATA, FOR THE NOT-THREATENED GROUP

Variable Predicted	Standard Deviation	Multiple R	Standard Error of Estimate $s_{z \cdot 23}$	Critical Deviation* $(1.96 s_{z \cdot 23})$
Abstract Reasoning, Form B (4 · 23)	5.30	.80	3.20	6.27
Holsopple, Frequency (5a · 23)	3.06	.58	2.50	4.90
Holsopple, Category (5b · 23)	0.97	.30	0.92	1.80
Holsopple, Capacity (5c · 23)	11.76	.59	9.51	18.64
Mirror Tracing Time (6a · 23)	49.10	.40	45.02	88.24
Mirror Tracing Error (6b · 23)	73.91	.77	46.99	92.10

* For the value of critical deviations, at the .05 level, the standard error is multiplied by 1.96, the table value on the normal curve. The final column is discussed on page 14.

assume that differences which discriminate significantly between the E and C groups on the posttests (Abstract Reasoning, Holsopple Sorting, and Mirror Tracing), are primarily due to the experimental variable. The results of both the experimental and control groups on the posttests (4, 5, and 6) will be investigated for such differences.

1. *Comparison of Means and Standard Deviations of Groups E and C on Posttests 4, 5, and 6*

The results reported in Table 2 show that the *means,* but not the *variances,* of most test scores differentiate the two groups. Test 4, the Abstract Reasoning test, is thought to measure the individual's ability to sustain a number of tasks simultaneously and to synthesize them into a single complex operation; the significant difference between means indicates that the experimental variable affects this ability. The Abstract Reasoning test is the only one which shows a significant difference in variance also.

Four of the six tests used show a significant difference in means, indicating that the ability in question was negatively affected by threat. This would seem to be evidence that the central hypothesis of this study has been supported.

2. *The Interrelationships of Tests: A Comparison between Group E and Group C*

An attempt was made to investigate the differences of the relationships of the two groups for significant deviations among all posttest scores of the individuals of both groups. For this purpose a matrix of correlation coefficients was tabulated (Table 3) permitting a comparison of the patterns of relationships between the two groups.

The standard error of the z-equivalents $(z_1 - z_2)$ for any pair of correlation coefficients in the matrix is .27. In order to arrive at the value that denotes significant differences between the experimental and the control groups at the .05 level, the standard error is multiplied by

TABLE 2

DIFFERENCE BETWEEN THREATENED AND NOT-THREATENED GROUPS ON EACH POSTTEST

Test		Threatened Group (E) $N=31$	Not-Threatened Group (C) $N=31$	t	F	Level of Significance
Abstract Reasoning, Form B (4)	*M*	35.32	39.71	2.51		<.02
	SD	7.94	5.30		2.24	>.01
Holsopple Frequency (5a)	*M*	11.77	14.55	3.91		<.01
	SD	2.39	3.06		1.63	>.05*
Holsopple Category (5b)	*M*	5.35	6.03	2.54		.02
	SD	1.09	0.97		1.28	>.05*
Holsopple Capacity (5c)	*M*	78.06	83.55	1.56		<.12*
	SD	15.30	11.76		1.69	>.05*
Mirror Tracing Time (6a)	*M*	90.97	59.97	2.23		.03
	SD	58.42	49.10		1.42	>.05*
Mirror Tracing Error (6b)	*M*	134.52	96.97	1.92		<.055*
	SD	77.37	73.91		1.10	>.05*

* These differences do not satisfy the criterion of significance established for this study.

TABLE 3

CORRELATIONS AMONG SCORES OF ALL TESTS FOR THREATENED (E) AND NOT-THREATENED (C) GROUPS

		Abstract Reasoning, Form A (2)	Vocabulary (3)	Abstract Reasoning, Form B (4)	Holsopple Frequency (5a)	Holsopple Category (5b)	Holsopple Capacity (5c)	Mirror Tracing Time (5c)	Mirror Tracing Error (6a)	Age (6b)
Abstract Reasoning, Form A (2)	E		.35	.78	.45	.26	.08	−.30	−.35	−.01
	C		.39	.77	.46	.30	.58	−.34	−.45	−.00
Vocabulary (3)	E			.29	.41	.46	−.03	.18	−.03	.30
	C			.50	.47	.16	.12	.06	.40	.05
Abstract Reasoning, Form B (4)	E				.46	.38	.05	−.52	−.56	−.03
	C				.40	.28	.51	−.22	−.22	−.08
Holsopple Frequency (5a)	E					.70	.24	−.21	−.40	.31
	C					.69	.73	−.08	−.26	−.06
Holsopple Category (5b)	E						−.33	−.10	−.30	.25
	C						.43	−.28	−.27	.17
Holsopple Capacity (5c)	E							−.25	−.08	.05
	C							−.22	−.24	−.00
Mirror Tracing Time (6a)	E								.71	.15
	C								.88	−.10
Mirror Tracing Error (6b)	E									.04
	C									.03

the table value on the normal curve corresponding to this level of confidence, or 1.96. The resulting value ($.27 \times 1.96 = .53$) is the difference between z's that is necessary to discriminate between the two groups.

An investigation of the matrix of z's reveals that actually only 2 of the 36 pairs of correlation coefficients of this matrix show a significant difference (r_{25c} and r_{5b5c}). At the .05 level, one would expect 1 of 20 differences to be of this size if they were independent; therefore, 2 such differences of 36 scarcely deserve comment.

According to this table, the experimental variable "threat" does not appear to have significantly influenced the relationships under which the individuals of Group A performed. This finding would suggest that the "threat" affected the group as a *whole* and not just the grossly deviating individual.

3. *Comparison of Predicted and Obtained Posttest Scores of Individuals in the Experimental Group*

The statistical method of multiple regression is utilized for a comparison of the predicted scores and the obtained scores of individuals in the experimental group. This will serve to point out those individuals who deviate most from the expected score. The predicted scores were derived from knowledge of the relationship between pretest and posttest scores in the control group.

Individuals who are here called "deviating" are those who show a difference between obtained and predicted scores that is *larger* than the "significant deviation" ($1.96\, s_{x \cdot 23}$) of each test (see Table 4).

The Abstract Reasoning Test. As can be seen in Table 1, the standard error of residuals obtained in estimating scores on the Abstract Reasoning test, Form A, from scores made on the Vocabulary test and the Abstract Reasoning test, Form B, is 3.30, and the "critical deviation" for the not-threatened group at the .05 level of confidence is $3.20 \times 1.96 = 6.27$. If this critical deviation is applied to a comparison of obtained and predicted scores for the threatened group, ten extreme individuals (indicated by asterisks in Table 4) are identified. Almost every one of these deviations is negative, the obtained score being smaller than the predicted score. The question could arise as to whether these differences are due to age or adjustment factors. Inasmuch as the ten individuals show a mean age of 26.5, as compared to a mean age of 25.8 for all others, and their adjustment categories show the same percentage distribution as those of the total group, age and adjustment factors *cannot* be said to account for the difference in scores.

It will be noted that eight of ten of these deviating individuals are to be found *at the low end* of the distribution of pretest scores (as shown by their low predicted scores). The mean predicted score of the 10 deviating individuals is $\bar{X} = 27.2$, while the mean for the 21 non-significantly deviating individuals is $\bar{X} = 39.2$ (see Table 5).

Holsopple Test, Frequency Score. The critical difference for the Holsopple Frequency score is $2.50 \times 1.96 = 4.90$. Six of eight deviating individuals are to be found below the mean of the distribution, but the remaining two individuals have average scores. The mean of the eight deviating cases is 9.9, while the mean of the other cases ($N = 23$) is 12.4. Again, most of the deviating individuals are found at the *lower end* of the distribution.

Holsopple Test, Category Score. The Holsopple Category score has a critical deviation of $.92 \times 1.96 = 1.80$. Only 4 individuals deviate significantly from the scores predicted for them, and all of these are in the negative direction. They also fall into the *lower end* of the distribution, having a mean of 4.0, as contrasted with a mean of 5.5 for the other 27 individuals.

Holsopple Capacity Score. The Holsopple Capacity score has a critical deviation of $9.51 \times 1.96 = 18.64$. Here, 6 individuals deviated from their predicted scores, showing a mean of 53.3 as compared with a mean of 84.0 for the 25 other deviating members of the group.

Mirror Time Score. The time score of the Mirror Tracing test, with a critical difference of $45.02 \times 1.96 = 88.24$, shows only 4 individuals deviating. These individuals are, again, in the end of the distribution which can be considered lowest in efficiency; they use the longest time periods to complete the tracing of the star, with

TABLE 4

PREDICTED AND OBTAINED SCORES OF INDIVIDUALS OF THE THREATENED GROUP, ON ALL POSTTESTS

Subject	Age	Rorschach Adjustment†	Abstract Reasoning Score		Holsopple Frequency Score		Holsopple Category Score		Holsopple Capacity Score		Mirror Tracing Time Score		Mirror Tracing Error Score	
			Predicted	Obtained	Predicted	Obtained	Predicted	Obtained	Predicted	Obtained	Predicted	Obtained	Predicted	Obtained
1	28	?	48.1*	39*	18.1	14	6.6	6	93.7	80	43.0*	144*	91.7*	204*
2	22	+	45.5	42	16.7*	11*	6.4	7	92.4*	44*	40.0	123	62.0*	210*
3	27	+	44.3*	38*	15.9	13	6.4	5	92.4	100	35.4	28	36.6	60
4	29	?	45.5	41	17.1*	12*	6.4	5	89.7	88	52.2	49	108.3	91
5	28	+	45.9	42	17.5*	12*	6.4	5	89.3	88	55.8	108	124.6	200
6	26	+	42.6	40	15.2	15	6.3	5	90.2	100	39.5	121	40.0*	157*
7	22	−	41.3	37	14.4*	8*	6.2*	4*	90.2*	57*	34.9	36	14.0	60
8	28	?	41.7	39	14.8	10	6.2*	4*	89.7	86	38.5	35	30.3	102
9	22	?	41.7	36	15.0*	9*	6.2*	4*	88.4	100	44.6	63	53.2*	162*
10	29	+	42.5	37	15.9	15	6.2	6	86.2	100	57.9	86	108.7	105
11	22	?	42.9	45	16.2	14	6.2	5	85.7	90	61.5	70	125.0	110
12	22	+	42.9	40	16.4*	11*	6.2	6	84.4*	55*	67.6	23	147.9*	50*
13	22	−	41.2	42	15.3*	10*	6.1*	4*	84.8	86	59.5	99	105.6	57
14	29	−	40.4	39	14.6	17	6.1	7	85.7	71	52.3	44	73.0	81
15	23	?	40.4	38	14.6	15	6.1	6	85.7	90	52.3	90	73.0	112
16	27	−	40.0	35	14.5	14	6.1	7	84.8*	64*	54.9	46	79.5	104
17	22	−	40.0	39	14.5	13	6.1	6	84.8	88	54.9	29	79.5	88
18	30	−	40.4	39	14.8	13	6.1	6	84.4	70	58.5	73	95.8	69
19	25	?	40.3	35	15.0	12	6.1	5	83.0	66	64.6	140	118.7	75
20	28	+	40.7	42	15.4	12	6.1	5	82.6	78	68.2	66	135.0	148
21	29	−	40.7*	33*	15.8	12	6.0	7	79.9*	50*	80.4*	236*	180.8*	97*
22	27	−	40.2	38	15.7	14	6.0	7	79.0	70	83.0	34	187.4*	82*
23	28	+	39.4*	30*	15.0	13	6.0	6	79.9	88	75.9	145	154.8	194
24	26	+	37.8*	32*	13.9	12	5.9	6	80.4	66	67.7	80	112.5	76
25	29	+	38.9	42	15.5	12	5.9	7	75.0	83	96.8	58	230.0*	101*
26	21	−	34.4*	27*	12.2	9	5.7	5	77.2	80	69.8	83	96.5*	206*
27	27	?	35.2*	24*	12.9*	7*	5.7	4	76.4*	50*	76.9*	231*	129.1*	396*
28	24	?	32.3	35	10.8	8	5.6	4	78.1	80	58.1	63	37.9	113
29	27	−	32.5*	26*	12.2	9	5.5	4	71.0	83	92.3	64	168.6	170
30	26	−	32.5*	12*	12.4	10	5.5	4	69.7	86	93.4	116	191.5	160
31	26	?	33.3*	11*	13.3	9	5.5	4	67.4	83	111.7*	237*	247.0	330

* The difference between the predicted and obtained scores is large enough to be significant.
† "?" = questionably adjusted; "+" = adjusted; "−" = maladjusted.

a mean of 212 against a mean of 73 for the other 27 individuals in this group.

Mirror Error Score. The error score of the Mirror Tracing test, with a critical difference of $46.99 \times 1.96 = 92.10$, shows 10 individuals deviating from their predicted scores. They show a predicted mean of 167, which compares with a mean of 119 for the other 21 individuals. The ones who deviate can be found at the end of the distribution which shows the largest error score.

Scores were predicted for the 31 individuals of the experimental group from the pretests (Abstract Reasoning [2], Vocabulary test [3] for the posttests (Abstract Reasoning [4], Holsopple Sorting Test [5a, b, c], Mirror Tracing test [6a, b]) according to the knowledge of relationships of the scores achieved by the individuals of the control group on these tests. It was reasoned that if a significant difference between the predicted and the obtained score were found for individuals of the experimental group, such differences would be due to the introduction of the experimental variable.

In an analysis of the data it was found that no individual shows a large positive deviation on any test. In every test mentioned, the individuals who differ significantly from their expected scores can be found in that end of the distribution which indicated the *lowest* achievement. These individuals are found there, although prediction places them elsewhere. Their pretest scores led to a prediction of low posttest scores; but the *actual* posttest scores are lower than predicted. The low posttest scores, therefore, result partly from low ability but, also, partly from the effect of threat and anxiety. It seems that the experimental variable (threat) affects individuals of good capacity, in that they tend to fall behind and are to be found in the lower end of the distribution. *Low scores of "threatened" individuals do not necessarily mean correspondingly low capacity.* In summarizing these data one could say that only high scores of "threatened" individuals seem to give reliable information about these individuals' capacities.

TABLE 5

DIFFERENCES BETWEEN PREDICTED AND OBTAINED POSTTEST SCORES FOR THE THREATENED GROUP

Test	Statistic	Deviating Individuals	All Others	t
Abstract Reasoning, Form B (4)	*N*	10	21	
	M	27.2	39.2	5.4
	SD	9.1	2.6	
Holsopple Frequency (5a)	*N*	8	23	
	M	9.9	12.4	2.7
	SD	2.2	2.7	
Holsopple Category (5b)	*N*	4	27	
	M	4.0	5.5	2.2
	SD	0.0	1.3	
Holsopple Capacity (5c)	*N*	6	25	
	M	53.3	84.0	6.9
	SD	6.6	10.0	
Mirror Tracing Time (6a)	*N*	4	27	
	M	212	73	7.1
	SD	38.8	33.5	
Mirror Tracing Error (6b)	*N*	10	21	
	M	167	119	1.6*
	SD	93.3	62.9	

* Below the level of significance accepted in this study.

4. *Observations of Behavior during Test Performance*

During the administration of the posttests (4, 5a, 5b, 5c, 6a, and 6b), all of which took place in individual conference with the experimenter, a short record of the individual's behavior was taken in terms of (*a*) negative self-references, (*b*) attitude in the discussion session (last ten minutes), and (*c*) the subject's belief as to whether the Rorschach interpretation "fitted" her or was "off." These observations are presented but any evaluation of them should be cautious.

a) Negative self-references were made by 19 subjects on the Mirror Tracing test and by 7 subjects on the Holsopple Sorting Test. Such self-references included remarks like "I am no good," "I can't work this test," or "I am probably your worst subject." Of the 19 subjects who reacted in this fashion on the Mirror test, 14 belonged to the experimental group and 5 to the control group. Of the 7 negative self-references in the Holsopple test, 5 belonged to the experimental group and only 2 to the control group. The percentages of the two groups are significantly different as established by the method of chi-square. These observations would suggest that the experimental variable influenced the subject's attitude towards herself—at least temporarily.

b) The subject's attitude in the discussion session was recorded as "therapeutic" or "nontherapeutic." The term "therapeutic" here means that the subject entered into the discussion with a desire to draw it in the direction of her adjustment, whereas the "nontherapeutic" term was used when the subject kept one discussion on a conversational level and asked questions about the research, etc.

This preconceived classification did not differentiate at all. Sixty-one of 62 subjects entered discussions of their adjustment problems, and the subject who did not do so had to leave the session early. No attempt was made to differentiate between "more" or "less" therapeutic.

c) Sixty of 62 subjects answered the first part of the question in the affirmative when asked, "Do you think the interpretation I gave you fits you; or do you think it is pretty far off?"

A total of 14 subjects indicated that they wanted therapeutic help. Six of these came from the experimental group and eight from the control group. Eleven had been classified by the Rorschach as belonging to the maladjusted class and three as belonging to the questionably adjusted class. Nine of these subjects left their names with the experimenter so that they might become participants in group therapy. Three of the subjects were assisted in contacting the school psychologist, and one subject already was in treatment.

Chapter V

SUMMARY, CONCLUSIONS, AND OUTLOOK

This study has been concerned with the question whether an individual under stress acts differently from the way he would have acted if not in such a state. More specifically, the following questions were asked: (*a*) Does an individual in a state of stress show a loss in the ability to sustain several tasks simultaneously and synthesize them into a single action? (*b*) Does this loss occur in the ability to categorize as measured by the Abstract Reasoning test? (*c*) Does the loss occur in the ability to shift from one concept to another as measured by the Holsopple Sorting Test? and (*d*) Does stress also produce a loss in motor-visual orientation as measured by the Mirror Tracing test? Stress, too, has been narrowed to a more specific meaning. For the purpose of this study "stress" is defined as *the perception of threat, with resulting anxiety.* This condition was thought to be produced by an interpretation of a personality record derived from a projective test. To produce stress, i.e., threat and anxiety, the Rorschach test, modified for group administration, was selected. The Rorschach was employed to produce a temporary threat by an interpretation that was somewhat structured but yet in accordance with the findings of the individual's record. In addition, the Rorschach results were to provide a measure of the adjustment of the individuals concerned.

The experiment was designed in such a way that a measure of the individual's capacity to perform in the area of abstract behavior could be obtained for every individual. This measure, together with such factors as sex, age, training, and adjustment ratings, was used to divide the subjects into equated groups, one called the experimental and the other the control group. Finally, both groups were retested for the capacity in question, with the experimental variable, "threat," being produced only in the experimental group.

A. Discussion of Design

This design has been subjected to statistical analysis. It was demonstrated that the equating of the control and experimental groups was satisfactory.

It was shown, by multiple correlation, that the capability of performing in the area of abstract behavior, as measured by the first set of tests, the pretests, reflected the capabilities measured in the second set of tests, the posttests (Table 1).

B. Treatment of Experimental Data

In a comparison of means and standard deviations of all the posttests for the experimental group and control group, it was demonstrated that *all the means* of these tests differentiated the two groups significantly. At the same time, none of the standard deviations of the two groups showed significant differences, with the exception of the *SD* of the Abstract Reasoning test. This would indicate that the loss by the threatened group, observed in the decrease of means is randomly distributed around the means (Table 2).

Analysis of a matrix of intercorrelations indicated that the "pattern of relationships" among all test scores of the individuals of the two groups is not influenced by the experimental variable

(Table 3). This would indicate that threat affects the group as a whole and not just grossly deviating individuals.

Furthermore, in a comparison of the predicted and obtained scores for the posttests of the experimental group, it was found that on every test the individuals whose obtained scores differed significantly from their expected scores *were located at that end of the distribution that indicated lowest achievement* (Table 4). These findings are interpreted to mean that *low scores* on tests which were administered to "threatened" individuals indicate a particularly low threat-tolerance for these individuals.

C. Observation of Behavior

In the observation of the individuals' behavior during the testing situation, some of the "threatened" individuals but practically none of the others made negative self-references such as "I am your worst subject," etc. This finding might suggest that the threat was related to a highly critical attitude toward self. When asked if they thought the Rorschach interpretation fitted them, 60 of 62 subjects answered in the affirmative.

D. Conclusion

The findings of this study would indicate that individuals who are faced with threat and who are in a state of anxiety show a loss of the "abstract" abilities or, more specifically, face a loss in flexibility of intellectual function and a disorientation of visual-motor coordination as measured by the particular instruments employed.

E. Outlook

The experimenter has attempted to integrate the findings of this experiment into broader theories of human behavior. It can be assumed that every experimental study that deals with specific performances is undertaken with the hope that some of the findings will have general application and not be confined to the specific experimental conditions. With all the necessary caution, the experimenter of this study, too, hopes that the specific "threat" he used is somewhat similar to the stress and anxiety that so frequently are experienced by individuals in our society, and that his concept of "abstract ability" is, indeed, related to such intellectual and perceptual functions as, in Goldstein's terms, "enable the organism to respond adequately." If for the purpose of outlook such identities are assumed, perhaps worthwhile speculations on the nature of maladjustment can be made.

Maladjustment is seen here as a self-perpetuating state in which needs of the organism are in conflict and create confused experiences which do not permit valid interpretations. An individual perceives and interprets each set of stimuli in many different ways according to his needs. However, the stimuli being perceived *have to be acted upon*. As one set of stimuli can be perceived and interpreted in different ways, each one of these ways will provoke a corresponding response action. It is when *these different response actions are mutually exclusive* that anxiety occurs. The individual projects his own need-confusion onto the stimuli and accordingly experiences an inability to respond adequately, i.e., to *choose* among mutually exclusively response actions. This confusion becomes manifest in the individual's inability to focus attention or to see the essentials in a given situation, because the different "essentials" are mutually exclusive. He experiences the stimuli as threatening

because he cannot cope with them, and, consequently, he is likely to limit his awareness of such experiences, i.e., his behavior will be characterized by rigidity and constriction. In maladjustment certain stimuli will be experienced in such confusion that responses to them are impossible; therefore, the interpretation of such threatening stimuli is *distorted* in such a way as to enable the individual to deal with them. It is likely that the *particular limitations* in perceived clues and the *particular distortion* can be explained in terms of regression: the individual will misinterpret stimuli as if they actually were stimuli to which he had responded *successfully* and *appropriately* in the past. The neurotic child who has successfully dealt with hostile parents in terms of tantrums is likely to experience his teacher as "hostile," in order to deal with her in the accustomed (and phenomenologically "appropriate") way. It seems that in neurosis there is not only this limitation and distortion of perception and interpretation, but an actual *provocation* to produce those stimuli which would fit into the established pattern. It is as if the neurotic wards off the threat of a novel situation by creating the familiar one even *before* the novel situation can occur. The inhibited man seeks women who will refuse him; the child who feels he is not loved will often challenge and annoy; the delinquent who regards authority as "bad" will provoke authority to be "bad" to him: although authority, when challenged, will hurt him, he has to challenge it to feel alive, and challenge is the only way he can cope with it. The psychotic who has lost contact with reality can be said to *create* familiar perceptions or experiences in *disregard* of the stimuli; his behavior can no longer be understood from any objective, external situation.

It is characteristic of the need-confusion that created the limitations and distortions in the perceptual and interpretive field that it is self-perpetuating; it was brought about by an *inability* to respond adequately to a set of stimuli that in turn were interpreted as a threat to the organism. Consequently, as the organism responds inadequately to such stimuli, the threat of such stimuli to the organism becomes larger. Thus, maladjustment becomes a vicious spiral of increasing confusion.

If one views maladjustment in these terms, therapy should be understood as a process that enables the individual to break through his own need-confusion by a thorough exploration of these needs. That is to say, the maladjusted individual should be placed in a unique situation in which he can dare to explore stimuli that he has previously regarded as threatening. Only in freedom from threat can the individual explore his own need-confusion and ambivalences and grow toward adjustment.

In addition to such speculations on the nature of maladjustment, some implications for the fields of applied psychology and education should be noted. If we can assume that threat and resulting anxiety restrict an individual's intellectual capacity, we may have to consider that our educational system of examinations and grades may produce certain negative effects. The threat which is perceived by individuals in varying degrees may serve to reduce this capacity to perform efficiently. The very common procedures of psychological diagnosis and efficiency ratings in industry and military service may have to be viewed in this light. Common practice urges the use of some examinations and some eval-

uations for promoting the effectiveness of individuals. It would seem, however, that these and other similar modes of personal evaluation which are conveyed to the individual may serve to reduce rather than enhance his effectiveness as a person. If one evaluates in this light parent-child relationships, marital relationships, relationships between employer and employee, and even those relationships between men in political life, the significance of the finding becomes evident.

APPENDIX A

ADDRESS TO STUDENTS OF TEACHERS COLLEGE WITH THE PURPOSE OF RECRUITING VOLUNTEERS FOR RESEARCH

I am a student in the Psychological Services of the Guidance Department. At this time I am working on a Ph.D. dissertation which is concerned with the measurement of personality structure.

Your instructor was kind enough to invite me to talk to you in order to find out if some of you would like to assist me in this research work. We all are terribly busy and I know that it is quite a sacrifice I am asking of you.

The measurements used in this research will include the Rorschach and some other very new tests of personality measurements. You will get to know these tests and you will contribute to our knowledge about them. I will be able to give you, after one group meeting and one individual meeting with you, a short and confidential report of my findings regarding your outcome on these instruments.

In order to control my measurements, I have to draw some limits as to whom I should test. I mean to include female students of the ages 20-30 years.

Would those of you who would like to cooperate in this work please write on the paper which has already been distributed your name and address and which day you would prefer to attend a group meeting?

Thank you for your attention.

Appendix B

KRUGMAN'S (10) NORMAL RORSCHACH RECORD

Number of *R:* 30–40
W%: approximately 30
dd%: } approximately 10%
S: }
P: good distribution
O: present
At, Sex: not excessive
F + *%:* 95–100
F%: less than 50
Fc: some but not excessive
FM: should be present
CF: approximately 1
C: not present

M: present but not too aggressive
M:FM: M larger than *FM*
Color shock: } not more than slight
Shading shock: }
Refusals: none
A + *H* : *AD* + *Hd: A* + *H* larger than *Ad* + *Hd*
H : (*H*): some *H* but few (*H*)
W : *M:* 2:1
R VIII–X: 30–40%
Bizarre: }
Perseveration: } no *R* in this category
Contamination: }
Stereotypy: }

Appendix C

EXAMPLE OF A RORSCHACH INTERPRETATION GIVEN TO THE SUBJECT

You must understand that we do not ordinarily give an interpretation of his Rorschach record to the patient. Such records are used for diagnosis of cases in various clinics. Patients very rarely are given information as to how they "made out."

On the other hand, students who have helped me with this research cannot be considered in the same category with patients; they have helped me and have given their time in order to find out something about themselves. I feel that they are entitled to some information.

Of course there is no sense of beating around the bush and I expect that you want me to be frank with you and tell you all that I can find in your record. (Pause . . . subject is offered a cigarette.)

According to this record, your intellectual endowment is greater than the actual functioning of your intelligence would indicate. That means that, intellectually, you are not living up to what you could be. Affectual, that is, emotional disturbance is causing this lag between ability and capacity. In competition with others, you feel intellectually inadequate; it seems to you that you do not do things as accurately as others do; and often you lose patience with yourself and finish matters, which you started carefully, in a rash and slipshod manner.

This feeling of intellectual inadequacy is comparable to a feeling of inadequacy in the emotional field. You feel that you are not as warm and outgoing as other people and that you cannot relate to people how sensitive you are. It seems that you are very sensitive, but that you use such sensitivity in spotting depreciations and insults that you feel are directed against yourself. You feel that you have to control your emotions lest they show and thus leave you open and undefended. You tend to withdraw with problems you have rather than to face them. This often leads to depressions.

You manage to get along well with some people, although you were not able to establish really close relationships. There are some indications that you feel strong antagonism towards quite a few people and that you hate to face them. You deal with these problems by being very active and productive. You feel that as long as you do things, you do not have to think; it is a sort of relief to you to be active. You don't particularly mind if your activity consists of routine work, so long as it keeps you busy.

Now, that is about all that shows up in a group Rorschach record and I would like to do some other tests now. Later on we will have another opportunity to talk things over.

Appendix D

SPECIMEN OF HOLSOPPLE SORTING TEST SCORING SHEET

Order of Admin. Series	SHADE	COLOR	SHAPE	SIZE	THICKN.	SYCOL	SYSHAPE	SYSIZE
1		X red 3		X large 2		X orange 1		X small
2	X light	X blue 1			X thin			X large 2
3	X dark		X square 2		X thick 3		X triangle 1	
4	X light			X small	X thick 1	X orange 2		
5		X red 2	X octag.				X triangle 1	X small
6			X square 4	X large 2		X white 3	X circle 1	

In each series, the concepts which are discovered should be marked in numerical order. Here, the subject in the first series responded first with "orange symbol," (Sycol = Symbol Color). His second response is "The large size of blocks" (Size). His third response is, "It's red" (Color). In the first series the subject did not discover the fourth concept. He discovered 2 concepts in the second series, 3 in the third series, 2 in the fourth series, 2 in the fifth, and 4 in the sixth series, a total of 16 concepts in seven of eight possible columns. Note that he did not always rediscover concepts that he *had* noted in an earlier series.

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